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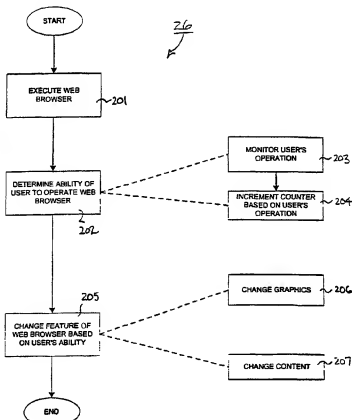
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(54) Title: MACHINE LEARNING INTERFACE FOR CUSTOMIZING A WEB BROWSER



(57) Abstract: A Web browser is customized by determining an ability of a user to operate the Web browser, and changing a feature associated with the Web browser based on the ability of the user. The feature may relate to a GUI for the Web browser, such as a toolbar, or the content that is available via the Web browser.

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## **MACHINE LEARNING INTERFACE FOR CUSTOMIZING A WEB BROWSER**

### **TECHNICAL FIELD**

This invention relates to customizing a Web browser.

### **BACKGROUND**

A Web browser enables a user to navigate the World Wide Web. The graphical user interface (GUI) for most Web browsers includes a toolbar with functions that can be operated using a mouse or other standard computer input device. Web browser GUIs are typically designed for advanced users, which can be a hindrance for inexperienced users such as small children.

### **SUMMARY**

This invention relates to customizing a Web browser based on the ability of a user to operate the Web browser. The ability of the user may be determined based, e.g., on the user's proficiency with a mouse or a keyboard. Features of the Web browser are customized based on this information. For example, if the user is unable to operate the mouse or keyboard accurately, the Web browser's GUI may be modified to reduce reliance on mouse and keyboard operations. Content available through the Web browser may also be restricted.

In general, in one aspect, the invention features determining an ability of a user to operate the Web browser, and changing a feature associated with the Web browser based on the ability of the user. By changing a feature associated with the Web browser based on the ability of the user, it is possible to customize the Web browser for the user. For example, a toolbar on the Web browser may be customized for an inexperienced user, such as a small child. Similarly, the content available to such a user may be limited, on the assumption that the user is, in fact, a minor.

This aspect of the invention may include one or more of the following features/functions. The ability of the user is determined based on operation of a mouse in conjunction with the Web browser. The ability of the user is determined based on operation of a keyboard in conjunction with the Web browser. The ability of the user is determined based on recognition of motion of an image displayed using the

Web browser. The ability of the user is determined based on a recognition of tools associated with the Web browser. The ability of the user is determined based on a recognition of objects displayed using the Web browser. The ability of the user is determined based on a recognition of text displayed using the Web browser. The ability of the user is determined based on a recognition of language displayed using the Web browser. The ability of the user is determined based on an age of the user.

The feature associated with the Web browser includes a graphical user interface for the Web browser. The graphical user interface includes a toolbar for the Web browser. The feature associated with the Web browser includes a functionality of the Web browser. The functionality of the Web browser relates to a use of an input device with the Web browser. The feature associated with the Web browser includes content displayed by the Web browser. The content includes one or more of the following: a link associated with a Web page, text associated with a Web page, a computer program associated with a Web page, and a banner associated with a Web page. The ability of the user to operate the Web browser is determined by keeping track of the user's interaction with the Web browser. Counters are used to keep track of the user's interaction with the Web browser.

The details of one or more embodiments of the invention are set forth in the accompanying drawings and the description below. Other features, objects, and advantages of the invention will be apparent from the description and drawings, and from the claims.

## DESCRIPTION OF DRAWINGS

Fig. 1 is a block diagram of a network on which an embodiment of the invention is implemented.

Fig. 2 is a flowchart showing a process for customizing a Web browser according to one embodiment of the invention.

Fig. 3 shows a display screen for selecting a cursor guide in the Web browser.

Figs. 4, 5 and 6 show different level GUIs for the Web browser.

Figs. 7, 8 and 9 shows windows for controlling the operation of the Web browser.

### DETAILED DESCRIPTION

Fig. 1 shows a network system 10 on which an embodiment of the invention is implemented. Network system 10 includes a World Wide Web (Web) server 11, which is in communication with client 12 over a network 14, such as the Internet.

Web server 11 is a computer, which maintains a Web site that is accessible to client 12 via network 14. Client 12 is a personal computer (PC) or other processing device. Client 12 includes input devices, such as a keyboard 15 and mouse 16, for inputting information and accessing data. Client 14 also includes a display screen 17 for viewing information, such as Web pages, output by Web server 11 (see below).

View 19 shows internal components of client 12. These components include a processor 21, which can be a microprocessor or microcontroller, and a memory 22. Memory 22 is a computer hard disk or other memory storage device that stores data and computer programs. Among the computer programs stored in memory 22 are an operating system 24, such as Microsoft Windows98, and a Web browser 25 for accessing Web pages over network 14. Web browser 25 can be customized in accordance with process 26 below. Process 26 may be implemented by computer instructions running within Web browser 25 or by routines called from Web browser 25.

Process 26 is shown in Fig. 2. In process 26, a user executes (201) browser 25 from client 12. In a Windows-based environment, this is done by clicking on an icon for browser 25, which results in the display shown in Fig. 3. There, the user is prompted to select a "guide" for use with browser 25. This guide can be any of a number of icons, such as icon 27. The guide takes the place of the cursor and is used to facilitate identification of the cursor onscreen.

After the guide has been selected, browser 25 determines (202) the level of ability of the user. This is done by displaying a GUI for the browser and monitoring (203) the user's operation of the browser. There are different levels of GUIs for browser 25, each with access to different functions. Any level GUI may be displayed at this point. In this embodiment, there are five levels of GUI; although the invention is not limited as such. These levels include an "interactive television" level in which browser 25 navigates automatically through a predetermined Web ring without substantial interaction with the user; a first "screen bumping" level (Fig. 4) in which

keyboard use and mouse clicks are not used to navigate the Web; a second "screen bumping" level in which mouse clicks, but not the keyboard, are used to navigate the Web; a "kids toolbar" level (Fig. 5) in which a relatively "simple" toolbar 29 is used to navigate the Web; and an "adult" level (Fig. 6) in which a "fully-functional" toolbar 30, mouse clicks, and the keyboard are used to navigate the Web. On the "screen bumping" interface, the user moves the cursor against the edges of the Web browser screen in order to navigate between Web sites.

Which level of functionality is displayed by browser 25 may be determined based on the user's ability to operate browser 25. When browser 25 is executed initially, the user may identify himself by name, age, amount of experience with the Internet, or other features. For example, as shown in Fig. 7, a control screen 31 for Web browser 25 may be displayed, e.g., by right clicking mouse 16 and selecting an appropriate option. Control screen 31 includes three tabs 32, 34 and 35. These tabs may be used to lock features of browser 25 in place or to permit browser 25 to change its features based on the machine learning techniques described below.

Options/controller tab 32 includes the following items in options section 36. Option 37 displays a Uniform Resource Locator (URL) box on browser 25. Option 39 restricts browser 25 to accessing Web sites within a predetermined Web ring. Option 40 allows the user to bookmark Web sites. Option 41 displays interactive television in Web browser 25 for a predetermined period of time. In the interactive television mode, browser 25 displays predetermined Web pages automatically and allows the user to interact with those Web pages through a mouse, keyboard, or other input device. Option 42 checks the content of sites accessed by browser 25. Option 44 enables children's sounds on browser 25.

Learning section 45 allows the user to lock the level of browser 25. Option 46 allows browser 25 to be operated without using the keyboard or without using mouse clicks; option 47 allows browser 25 to be operated without using the keyboard and with large borders; option 49 allows browser 25 to be operated without using the keyboard and with small borders; option 50 allows browser 25 to be operated using the keyboard and the mouse; and option 51 allows ongoing learning. Ongoing learning means that the use of the mouse and keyboard are set based on the user's proficiency, as described below.

Interface section 52 determines the graphic content of the Web browser GUI. Option 54 provides an interactive television interface; option 55 provides a screen bumping interface; option 56 provides a screen cursor navigation interface in which the user navigates using the cursor alone; option 57 provides a simple toolbar and no URL box; and option 59 provides an expanded toolbar and a URL box. An additional option 60 may be provided to enhance visibility (e.g., high contrast, large fonts and URL box) of the Web browser GUI.

Content filtering section 61 includes options for filtering content from Web sites. These options include option 62 for blocking access to Web sites that include words provided in a keyword list; option 64 for allowing a secure connection over browser 25; option 65 for allowing forms to be transmitted via browser 25; option 66 for enabling JAVA script and applets via browser 25; option 67 for stripping advertising from Web pages; option 69 for stripping animation from Web pages; option 70 for stripping non-native text from Web pages; option 71 for allowing graphics filtering; option 72 for allowing text summarization; option 74 for allowing direct access to another browser such as Microsoft Internet Explorer; option 75 for allowing magnification of Web pages; option 76 for maintaining a user profile; option 77 for allowing window spawning in browser 25; option 79 for allowing frame transformation in browser 25; option 80 for enabling URL stripping from browser 25; option 81 for automatically navigating URLs via browser 25; option 82 for enabling picture ratings in browser 25; and option 84 for using ratings services in the context of browser 25. The foregoing options are enabled by clicking on Enable Local Proxy box 85. Clicking on Lock button 86 locks the settings in place. These settings may then be changed by entering the correct password in password line 87. Clicking on Okay button 89 confirms the changes and clicking on Quit button 90 exits without confirming the changes.

Proxy controls are provided via tab 35. Clicking on tab 35 displays window 91 shown in Fig. 8. The options shown in window 91 allow a user to configure browser 25 with the servers/options shown. These options include common proxies and Internet services. Clicking on Lock button 86 locks the settings in place. These settings may then be changed by entering the correct password in password line 87.

Clicking on Okay button 89 confirms the changes and clicking on Quit button 90 exits without confirming the changes.

Machine learning tab 34 summarizes the results of process 26 and is described in detail below. Returning to Fig. 2, Web browser 25 may select a browser GUI with an initial level of functionality appropriate for that user. This information may be obtained via control screen 31 and/or it may be stored in a user profile within Web browser 25. The GUI can be modified using machine learning techniques that are based on the user's interaction with Web browser 25.

To determine (202) the user's ability to interact with Web browser 25, process 26 monitors (203) the user's interactions with Web browser 25. Any types of operations may be monitored. In this embodiment, process 26 monitors the user's ability to use a mouse, to use a keyboard, to recognize motion of an image displayed by Web browser 25, to recognize tools in a toolbar of Web browser 25, to recognize objects displayed by Web browser 25, to recognize text displayed by Web browser 25, and to recognize a language, such as English.

By way of example, process 26 monitors the user's ability to use a mouse based on whether the user is able to accurately point and click on items displayed by browser 25. For example, the user may point and click on toolbar icons or hyperlinks. Process 26 knows the locations of such items and determines whether the user is operating the mouse accurately, meaning whether the user's point and click operations are hitting the items or are being misdirected. Process 26 keeps a running count of the number of accurate "points and clicks" and the number of inaccurate "points and clicks" over a predetermined period of time after initial logon. An appropriate software counter is incremented (204) each time a point and click operation occurs.

Based on these counters, process 26 makes an estimate of the user's ability to operate Web browser 25 and, in some cases, infers the user's age from this information. Process 26 changes (205) features of Web browser 25 accordingly. For example, process 26 may change graphics/toolbars (206) available on the GUI for Web browser 25. The level of the GUI may be changed from the "adult" level GUI to the first "screen bumping" level in which keyboard use and mouse clicks are not used to navigate the Web. It is noted that the invention is not limited to switching between



the five GUI levels noted above or the options noted below. Any features of Web browser 25 may be changed based on the counters.

In addition to changing graphics features available on Web browser 25, process 26 may change (207) the content available via Web browser 25. Such content includes, but is not limited to, a link associated with a Web page, text associated with a Web page, a computer program associated with a Web page, and a banner associated with a Web page. For example, if process 26 estimates that the user is a child based on mouse use, process 26 may strip inappropriate (e.g., sexual) content from Web pages prior to display. The content that may be stripped includes that noted above, namely text, Java applets and Java script code, banners or advertisements, blocked links, explicit content, offsite Web pages, and/or offsite Web links. Process 26 may determine the appropriateness of specific content based on information contained therein, or it may refer to an existing database (for example a database of URLs) to determine if content is inappropriate for the current user.

Process 26 may also alter the content displayed using Web browser 25 by converting the content from one form to another. For example, if process 26 determines that the user is able to recognize "object" (or icon) links but not "text" links (see below), Web browser 25 may identify text links displayed on browser 25 and convert those text links into object links.

Operations in addition to mouse clicks may be used to determine the user's ability to operate browser 25. For example, the user's interaction with keyboard 15 is also monitored. For instance, attempts to add text to inappropriate areas of a Web page are taken as indications that the user is unfamiliar with operation of the keyboard in a Web-related context. One or more counters may be used to keep track of this information, as above. The Web browser can then be modified accordingly based on the counters.

A user's ability to recognize and react to the motion of images displayed by Web browser 25 may also be monitored and used in deciding whether to change features of Web browser 25. Other objects/information that may be monitored to change features of Web browser 25 include the user's age, recognition of tools associated with Web browser 25, recognition of objects displayed using Web browser 25, recognition of text displayed using Web browser 25, and language recognition.

These features may be monitored in a number of ways. For example, if the user clicks on text links regularly, Web browser 25 infers that the user can recognize text. Similarly, if the user clicks on text links in a particular language, such as English, Web browser 25 infers that the user recognizes English. By contrast, if the user clicks on "object" links rather than text links, Web browser 25 infers that the user recognizes objects. One or more counters may be used to keep track of this information. The output of these counters is then used to change features (e.g., GUI and/or content) of Web browser 25, as described above.

Fig. 9 shows window 100 displayed by machine learning tab 34 from control screen 31. Window 100 includes devices section 101 for displaying counter results relating to the user's ability to interact with Web browser 25. Item 102 displays an indication of the user's ability to operate a mouse; item 103 displays an indication of the user's ability to operate a keyboard; item 104 displays an indication of the user's ability to operate in a windowing operating system; item 105 displays an indication of the user's ability to recognize objects; item 106 displays an indication of the user's ability to recognize voice; item 107 displays an indication of the user's ability to recognize motion; and item 108 displays an indication of the user's ability to recognize tools on Web browser 25. These indications correspond to the counter results described above.

Transformations section 109 displays a list of transformations that may be performed in Web browser 25. Selecting one of the options in this section causes Web browser 25 to perform the selected function. Option 110 transforms graphics to text; option 111 transforms text to graphics; option 112 summarizes displayed text; option 114 transforms hyperlinks into objects; option 116 causes browser 25 to automatically navigate through a set of predetermined links; and option 117 magnifies onscreen graphics.

Graphics section 119 includes items relating to graphics and object recognition. These items include graphics "timer" 120 which is a counter that is decremented when it is determined that a user is competent with a device, such as a mouse or keyboard, and incremented when a user is incompetent with a device; option 121 which provides an indication of the user's ability to recognize graphical hyperlinks; and option 122 which provides an indication of the user's ability to

recognize graphics objects. Pull-down bars 124 and 125 are provided for checking a user's competency level in various areas. For example, the user's ability to recognize objects/images displayed by Web browser 25 may be checked using competence pull-down bar 125.

- 5           Text section 126 includes items relating to text and language recognition. These items include text "timer" 127 which is a counter that is decremented when it is determined that a user is able to read and manipulate text and incremented when it is determined that the user is unable to read and manipulate text; option 129 which provides an indication of the user's ability to recognize textual hyperlinks; and option
- 10       130 which provides an indication of the user's ability to recognize text formats. Pull-down bars 131 and 132 are provided for checking a user's competency level in various areas. For example, the user's ability to recognize language displayed by Web browser 25 may be checked using competence pull-down bar 132.

- Graphics "timer" 120 and text "timer" 127, when taken together, trigger
- 15       transformations in the Web browser GUI and available content. A characteristic "array" of counter values may correspond to discrete "ages" of users. For example, children of a certain age may be able to click on images very quickly, but not to use scroll bars or to investigate "off-screen" text. Similarly, the elderly or slightly
- 20       impaired may only click on large text and graphics, and only scroll through large text and graphics objects. Others may not be able to use the keyboard or mouse. As described herein, the Web browser GUI is modified based on this information.

- Blocking section 134 shows information that is used to display an overall link recognition count 135, an overall object recognition count 136, and an age estimate
- 25       137 for the user that is determined based on the information obtained above, such as mouse and keyboard accuracy, object recognition, etc. This age estimate may be used to change features of Web browser 25, as described above. Communication section 139 specifies the communication configuration for Web browser 25. The options in window 100 may be password protected, in which case a password must be entered in block 87 in order to change the options. Lock button 86 locks the selected options,
- 30       okay button 89 confirms the selected options, and quit button 90 exits without saving the changes.

Process 26 is not limited to use with the particular hardware/software configuration of Fig. 1; it may find applicability in any computing or processing environment. Process 26 may be implemented in computer programs executing on programmable computers that each includes a processor, a storage medium readable by the processor (including volatile and non-volatile memory and/or storage elements), at least one input device, and one or more output devices. Program code may be applied to data entered using an input device to perform process 26 and to generate output information for display.

Each such program may be implemented in a high level procedural or object-oriented programming language to communicate with a computer system. However, the programs can be implemented in assembly or machine language. The language may be a compiled or an interpreted language.

Each computer program may be stored on a storage medium or device (e.g., CD-ROM, hard disk, or magnetic diskette) that is readable by a general or special purpose programmable computer for configuring and operating the computer when the storage medium or device is read by the computer to perform process 26. Process 26 may also be implemented as a computer-readable storage medium, configured with a computer program, where, upon execution, instructions in the computer program cause the computer to operate in accordance with process 26.

Other embodiments not described herein are also within the scope of the following claims. For example, features of the Web browser other than those noted above may be changed. The machine learning techniques described above can also be used outside the context of Web browsers.

WHAT IS CLAIMED IS:

1. A method of customizing a Web browser, comprising:  
determining an ability of a user to operate the Web browser; and  
5 changing a feature associated with the Web browser based on the ability of the user.
2. The method of claim 1, wherein the ability of the user is determined based on operation of a mouse in conjunction with the Web browser.
3. The method of claim 1, wherein the ability of the user is determined based on operation of a keyboard in conjunction with the Web browser.
- 10 4. The method of claim 1, wherein the ability of the user is determined based on a recognition of motion of an image displayed using the Web browser.
5. The method of claim 1, wherein the ability of the user is determined based on a recognition of tools associated with the Web browser.
- 15 6. The method of claim 1, wherein the ability of the user is determined based on a recognition of objects displayed using the Web browser.
7. The method of claim 1, wherein the ability of the user is determined based on a recognition of text displayed using the Web browser.
8. The method of claim 1, wherein the ability of the user is determined based on a recognition of language displayed using the Web browser.
- 20 9. The method of claim 1, wherein the ability of the user is determined based on an age of the user.
10. The method of claim 1, wherein the feature associated with the Web browser comprises a graphical user interface for the Web browser.

11. The method of claim 10, wherein the graphical user interface comprises a toolbar for the Web browser.
12. The method of claim 1, wherein the feature associated with the Web browser comprises a functionality of the Web browser.
- 5        13. The method of claim 12, wherein the functionality of the Web browser relates to a use of an input device with the Web browser.
14. The method of claim 1, wherein the feature associated with the Web browser comprises content displayed by the Web browser.
- 10        15. The method of claim 14, wherein the content comprises one or more of the following: a link associated with a Web page, text associated with a Web page, a computer program associated with a Web page, and a banner associated with a Web page.
16. The method of claim 1, wherein the ability of the user to operate the Web browser is determined by keeping track of the user's interaction with the Web browser.
- 15        17. The method of claim 16, wherein counters are used to keep track of the user's interaction with the Web browser.
18. A computer program stored on a computer-readable medium for customizing a Web browser, the computer program comprising instructions that cause a computer to:
- 20        determine an ability of a user to operate the Web browser; and  
change a feature associated with the Web browser based on the ability of the user.
19. The computer program of claim 18, wherein the ability of the user is determined based on operation of a mouse in conjunction with the Web browser.

20. The computer program of claim 18, wherein the ability of the user is determined based on operation of a keyboard in conjunction with the Web browser.
21. The computer program of claim 18, wherein the ability of the user is determined based on a recognition of motion of an image displayed using the Web browser.
22. The computer program of claim 18, wherein the ability of the user is determined based on a recognition of tools associated with the Web browser.
23. The computer program of claim 18, wherein the ability of the user is determined based on a recognition of objects displayed using the Web browser.
24. The computer program of claim 18, wherein the ability of the user is determined based on a recognition of text displayed using the Web browser.
25. The computer program of claim 18, wherein the ability of the user is determined based on a recognition of language displayed using the Web browser.
26. The computer program of claim 18, wherein the ability of the user is determined based on an age of the user.
27. The computer program of claim 18, wherein the feature associated with the Web browser comprises a graphical user interface for the Web browser.
28. The computer program of claim 27, wherein the graphical user interface comprises a toolbar for the Web browser.
29. The computer program of claim 18, wherein the feature associated with the Web browser comprises a functionality of the Web browser.
30. The computer program of claim 29, wherein the functionality of the Web browser relates to a use of an input device with the Web browser.

31. The computer program of claim 18, wherein the feature associated with the Web browser comprises content displayed by the Web browser.
32. The computer program of claim 31, wherein the content comprises one or more of the following: a link associated with a Web page, text associated with a Web page, a computer program associated with a Web page, and a banner associated with a Web page.
33. The computer program of claim 18, wherein the ability of the user to operate the Web browser is determined by keeping track of the user's interaction with the Web browser.
34. The computer program of claim 33, wherein counters are used to keep track of the user's interaction with the Web browser.
35. An apparatus which displays and customizes a Web browser, comprising: a memory which stores computer instructions; and a processor which executes the computer instructions to (i) determine an ability of a user to operate the Web browser, and (ii) change a feature associated with the Web browser based on the ability of the user.
36. The apparatus of claim 35, wherein the ability of the user is determined based on operation of a mouse in conjunction with the Web browser.
37. The apparatus of claim 35, wherein the ability of the user is determined based on operation of a keyboard in conjunction with the Web browser.
38. The apparatus of claim 35, wherein the ability of the user is determined based on a recognition of motion of an image displayed using the Web browser.
39. The apparatus of claim 35, wherein the ability of the user is determined based on a recognition of tools associated with the Web browser.



40. The apparatus of claim 35, wherein the ability of the user is determined based on a recognition of objects displayed using the Web browser.
41. The apparatus of claim 35, wherein the ability of the user is determined based on a recognition of text displayed using the Web browser.
- 5        42. The apparatus of claim 35, wherein the ability of the user is determined based on a recognition of language displayed using the Web browser.
43. The apparatus of claim 35, wherein the ability of the user is determined based on an age of the user.
44. The apparatus of claim 35, wherein the feature associated with the Web  
10 browser comprises a graphical user interface for the Web browser.
45. The apparatus of claim 44, wherein the graphical user interface comprises a toolbar for the Web browser.
46. The apparatus of claim 35, wherein the feature associated with the Web browser comprises a functionality of the Web browser.
- 15        47. The apparatus of claim 46, wherein the functionality of the Web browser relates to a use of an input device with the Web browser.
48. The apparatus of claim 35, wherein the feature associated with the Web browser comprises content displayed by the Web browser.
- 20        49. The apparatus of claim 48, wherein the content comprises one or more of the following: a link associated with a Web page, text associated with a Web page, a computer program associated with a Web page, and a banner associated with a Web page.

50. The apparatus of claim 35, wherein the ability of the user to operate the Web browser is determined by keeping track of the user's interaction with the Web browser.

51. The apparatus of claim 50, wherein counters are used to keep track of the  
5 user's interaction with the Web browser.

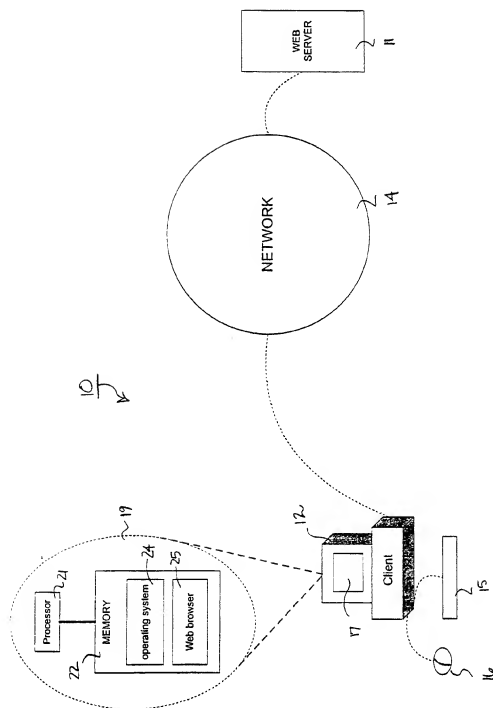


FIG. 1

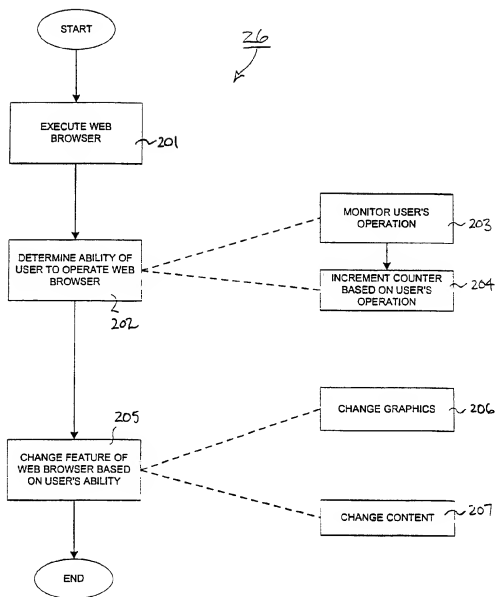


FIG. 2

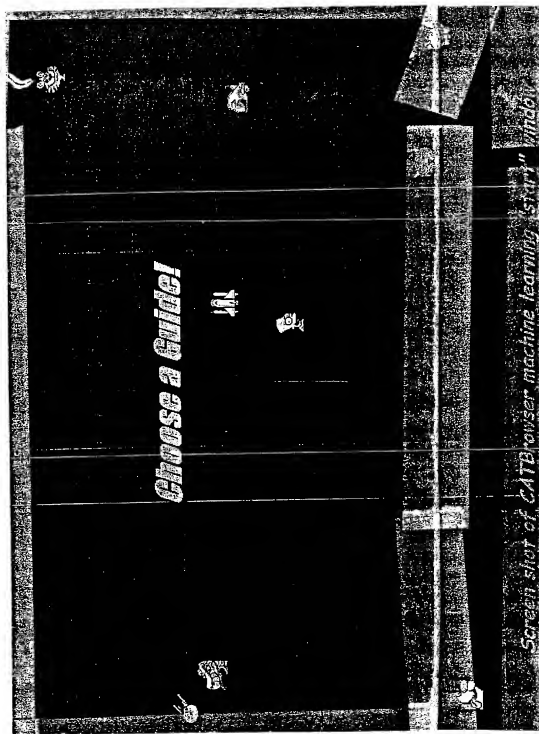


FIG. 3

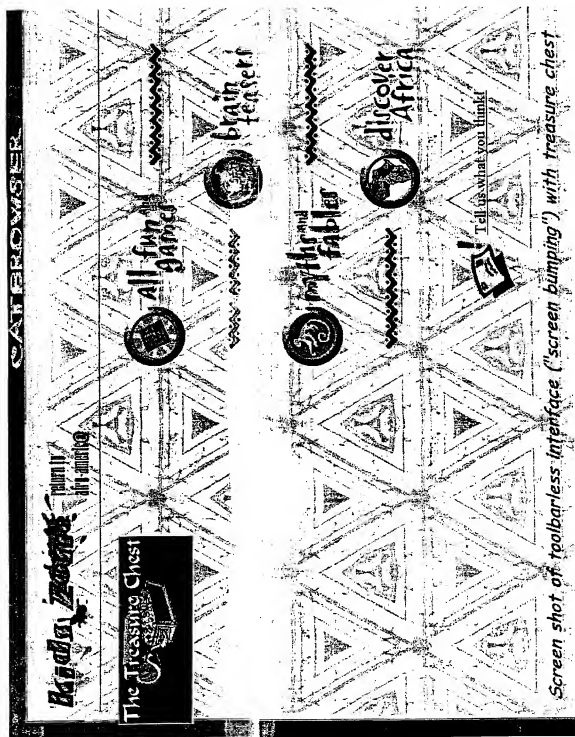


FIG. 4

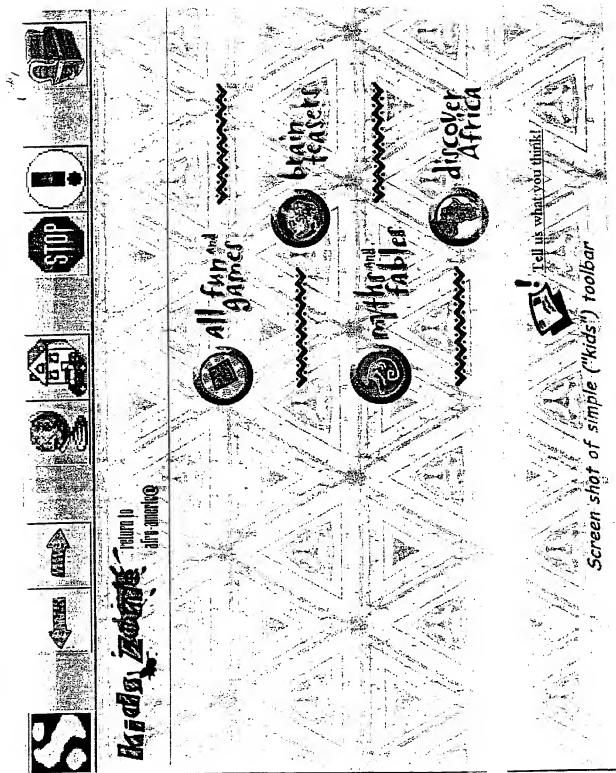


FIG. 5

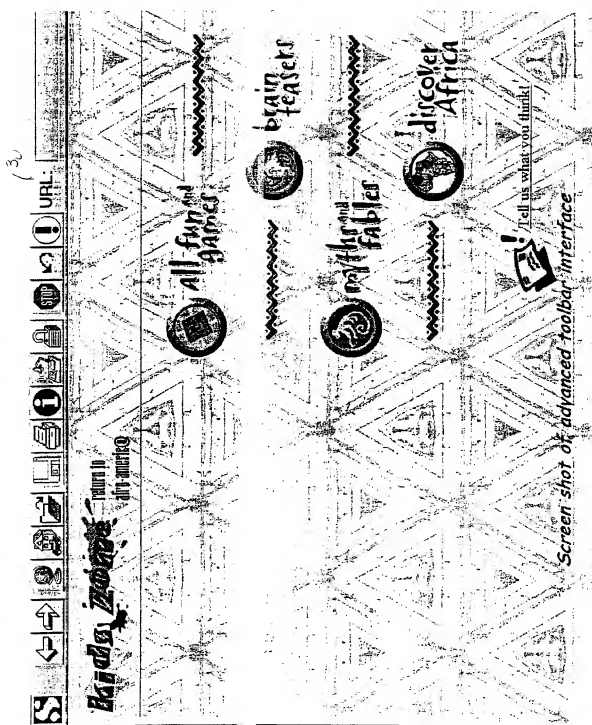


FIG. 6



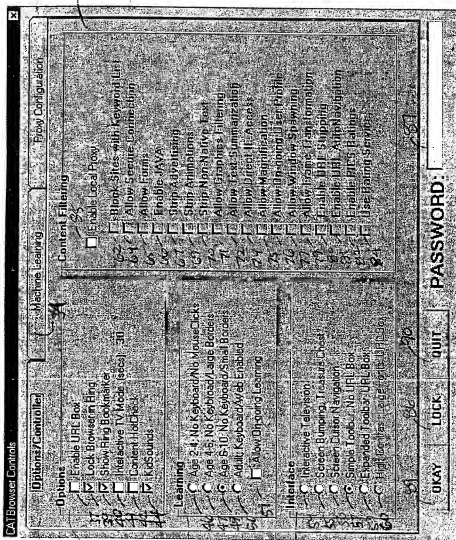


FIG. 7

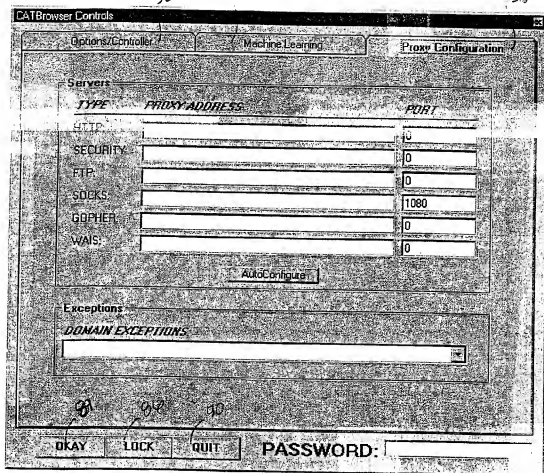


FIG. 8

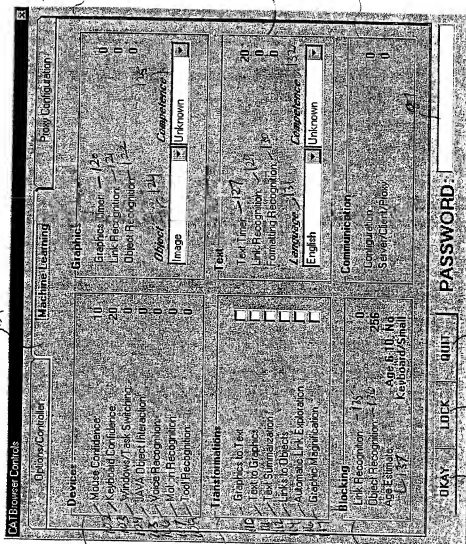


FIG. 9

## PC-T/US 01/03321

## IPC 7 G06F17/30

According to International Patent Classification (IPC) or to both national classification and IPC

## Minimum documentation searched (classification system followed by classification symbols)

IPC 7 G06F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, INSPEC

### C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages
1	...
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Relevant to claim No.

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Retrieved from the Internet:  
<URL:<http://www.starlab.org/bits/catbrowser>  
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The whole document, in particular section entitled "Description" (p.5-6)

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Further documents are listed in the continuation of box C.

7

Patent family members are listed in annex.

\* Special categories of cited documents \*

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Date of the actual completion of the international search

24 April 2001

Date of mailing of the international search report

14/05/2001

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## INTERNATIONAL SEARCH REPORT

International Application No.

PCT/US 01/03321

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	<p>C. STEPHANIDIS, A. PARAMYTHIS, C. KARAGIANNIDIS, A. SAVIDIS: "Supporting Interface Adaptation: the AVANTI Web Browser" PROCEEDINGS 3RD ERCIM WORKSHOP ON USER INTERFACES FOR ALL (UI4ALL), 'Online!' 3 - 4 November 1997, pages 1-14, XP002165770 FR</p> <p>Retrieved from the Internet: &lt;URL:http://ui4all.ics.forth.gr/UI4ALL-97/proceedings.html&gt; 'retrieved on 2001-04-12! 1. Introduction and Background 2.2 The Adaptation Mechanism 3. The Unified Browser Interface figures 2,6,7</p>	1-51
X	<p>C. STEPHANIDIS, A. PARAMYTHIS, D. AKOUMIANAKIS, M. SFYRAKIS: "Self-Adapting Web-based Systems: Towards Universal Accessibility" PROCEEDINGS 4TH ERCIM WORKSHOP ON USER INTERFACES FOR ALL (UI4ALL), 'Online!' 19 - 21 October 1998, pages 1-17, XP002165771 Stockholm, SE</p> <p>Retrieved from the Internet: &lt;URL:http://ui4all.ics.forth.gr/UI4ALL-98/proceedings.html&gt; 'retrieved on 2001-04-12! 2. Self-adaptation and accessibility 3.1 Content-level adaptations in AVANTI 3.2 User interface-level adaptations in AVANTI</p>	1-51
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## INTERNATIONAL SEARCH REPORT

International Application No.

PCT/US 01/03321

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	<p>T. MIAH, M. KARAGEORGOU, R. P. KNOTT: "Adaptive Toolbars: An Architectural Overview" PROCEEDINGS 3RD ERCIM WORKSHOP ON USER INTERFACES FOR ALL (UI4ALL), 'Online! 3 - 4 November 1997, pages 1-7, XP002165773 FR Retrieved from the Internet: &lt;URL:http://ui4all.ics.forth.gr/UI4ALL-97/ proceedings.html&gt; 'retrieved on 2001-04-12! 2. Adaptive Toolbars -----</p>	<p>10, 11, 16, 17, 27, 28, 33, 34, 44, 45, 50, 51</p>